Remarks

Applicant respectfully requests favorable reconsideration of this response and amendment, as well as consideration of the pending claims as amended herein. The Examiner is encouraged to contact the undersigned by telephone to facilitate any remaining questions or issues.

Status of Pending Claims:

Claims 216-220, 222-229, 231-232, 235, 237-253, 258-260, 342 and 350 are pending in this application.

Claim 216 is (Currently amended).

Claims 218-219, 222-224, 227-229, 231-232, 235, 237-244, 247-250, 252-253, 258-260, 342 and 350 are (Previously presented).

Claims 217, 220, 225-226, 238, 245-246 and 251 are (Original).

There are no claims which are (New).

Claims 1-215, 221, 230, 233-234, 236, 254-257 are (Canceled).

Claims 261-341 and 343-349 are (Withdrawn).

Amendments to the Claims:

An amendment is made to claim 216 to correct grammar.

Summary of Examiner's Claim Rejections:

Claims 216-220, 222, 224, 231, 235, 238-240, 243, 248-253, 258, 342, are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4841731 (Tindell) in view of U.S. 7062912 (Penfornis et al.). Claim 223 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 4841731 (Tindell) in view of U.S. 7062912 (Penfornis et al.) and U.S. 6588212 (Wallace et al.). Claims 225-227 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of U.S. 7062912 (Penfornis et al.) and U.S. 5899072 (Gode). Claims 231, 235 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of U.S. 7062912 (Penfornis et al.) and U.S. 5516359 (Kang et al). Claim 237 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of U.S. 7062912 (Penfornis et al.) and U.S. 4440545 (Weidig). Claim 241 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of U.S. 7062912 (Penfornis et al.) and U.S. 3975913 (Erickson). Claim 242 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of U.S. 7062912

(Penfornis et al.) and U.S. 4664857 (Nambu). Claims 259-260, 350 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of U.S. 7062912 (Penfornis et al.) and U.S. 6212876 (Gregory et al.). Claims 244-247 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of U.S. 7062912 (Penfornis et al.) and U.S. 6698183 (Thordarson).

Examiner Statements

Examiner Statement

Applicant has refused to accept the Examiner's proposal to put this case in condition for allowance. Therefore, no further discussion about that proposal is needed.

Applicant's Response

Applicant wishes to respectfully present to the Examiner that Applicant appreciates the Examiner's proposal; however, it is the Applicant's position to decide which claims have value to the Applicant and which claims to seek claim allowance. Again, Applicant thanks the Examiner for his considerations.

Examiner Statement

Applicant argued again "to regenerate" is not "to power" and repeat almost the same arguments about the Scharpf et al reference. Even thought the Examiner disagrees with Applicant's arguments, a new reference, US 7062912 (Penfornis et al), is used to replace the Scharpf et al as a secondary reference to clearly point out that the output from the combustion process is used to power an air separation unit.

Applicant's Response

Applicant wishes to respectfully state to the Examiner that Applicant is only presenting argument which is in concert with the teachings of the Examiner's Citations and in concert with the English language, as referenced. Applicant understands the Examiner's argument. Applicant appreciates the Examiner's withdrawal of the Examiner's previous claim rejections.

Examiner Statement

Applicant argued again Hurd does not disclose hydrogen gel in frozen water. Another new reference, US 4664857 (Nambu), is used to replace the Hurd reference to teach the hydrogel being frozen with water.

Applicant's Response

Applicant wishes to respectfully state to the Examiner that Applicant is only presenting argument which is in concert within the teachings of the Examiner's Citations and in concert with

the English language, as referenced. Applicant understands the Examiner's argument. Applicant appreciates the Examiner's withdrawal of the Examiner's previous claim rejections.

Examiner Statement

Applicant argued the declaration under rule 312 is directed to the claimed invention, not the invention. The Examiner strongly disagrees. First, Applicant simply provides his own argument, this is improper, but he must provide argument, Applicant's argument cannot replace evidence in affidavit 312, note MPEP 716.01(c). Second, the declarations fail to compare the claimed subject matter with the closest prior art as required in MPEP 716.02(e), it's unclear how Applicant can jump to a conclusion that his declaration could overcome the pending rejections without providing any comparison with the prior art, or any opinion about the rejection in the declaration. Third and most importantly, even assuming arguendo that the declaration meet all the requirements that provide evidences, comparison with prior art, opinions about the pending rejections, the Examiner still needs to use his judgment of a person having ordinary skill in the art to make his decision.

Applicant's Response

Applicant wishes to respectfully present to the Examiner:

1. First, that Applicant's argument comprised direct quotations from the declarations provided. Should the Examiner believe that Applicant did not provide direct quotations, Applicant refers the Examiner to the declarations provided.
2. Second, Applicant wishes to respectfully present to the Examiner that the Examiner is misquoting and misapplying applicable sections of the MPEP. Specifically, MPEP 716.02(e) relates to declarations which present the criticality of a claimed range, which is a responsive argument relating to unexpected or surprising results, e.g. MPEP 716.02. MPEP 716.02 (e) states:

> II. < DEMONSTRATING CRITICALITY OF A CLAIMED RANGE
>
> To establish unexpected results over a claimed range, applicants should compare a sufficient number of tests both inside and outside the claimed range to

show the criticality of the claimed range. *In re Hill*, 284 F.2d 955, 128 USPQ 197 (CCPA 1960).

716.02(e) Comparison With Closest Prior Art [R-2]

An affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a *prima facie* case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979). "A comparison of the *claimed* invention with the disclosure of each cited reference to determine the number of claim limitations in common with each reference, bearing in mind the relative importance of particular limitations, will usually yield the closest single prior art reference." *In re Merchant*, 575 F.2d 865, 868, 197 USPQ 785, 787 (CCPA 1978) (emphasis in original). Where the comparison is not identical with the reference disclosure, deviations therefrom should be explained, *In re Finley*, 174 F.2d 130, 81 USPQ 383 (CCPA 1949), and if not explained should be noted and evaluated, and if significant, explanation should be required. *In re Armstrong*, 280 F.2d 132, 126 USPQ 281 (CCPA 1960) (deviations from example were inconsequential).

>

In contrast, the applicable MPEP Section relating to answering a long felt yet unresolved need, which is the argument presented by Applicant, is MPEP 716.04, which states:

716.04 Long-Felt Need and Failure of Others [R-2]

>

I. < THE CLAIMED INVENTION MUST SATISFY A LONG-FELT NEED WHICH WAS RECOGNIZED, PERSISTENT, AND NOT SOLVED BY OTHERS

Establishing long-felt need requires objective evidence that an art recognized problem existed in the art for a long period of time without solution. The relevance of long-felt need and the failure of others to the issue of obviousness depends on several factors. First, the need must have been a persistent one that was recognized by those of ordinary skill in the art. *In re Gershon*, 372 F.2d 535, 539, 152 USPQ 602, 605 (CCPA 1967) ("Since the alleged problem in this case was first recognized by appellants, and others apparently have not yet become aware of its existence, it goes without saying that there could not possibly be any evidence of either a long felt need in the . . . art for a solution to a problem of dubious existence or failure of others skilled in the art who unsuccessfully attempted to solve a problem of which they were not aware."); *Orthopedic Equipment Co., Inc. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 217 USPQ 1281 (Fed. Cir. 1983) (Although the claimed invention achieved the desirable result of reducing inventories, there was no evidence of any prior unsuccessful attempts to do so.).

Second, the long-felt need must not have been satisfied by another before the invention by applicant. *Newell Companies v. Kenney Mfg. Co.*, 864 F.2d 757, 768, 9 USPQ2d 1417, 1426 (Fed. Cir. 1988) (Although at one time there was a long-felt need for a "do-it-yourself" window shade material which was adjustable without the use of tools, a prior art product fulfilled the need by using a scored plastic material which could be torn. "[O]nce another supplied the key element, there was no long-felt need or, indeed, a problem to be solved".)

Third, the invention must in fact satisfy the long-felt need. *In re Cavanagh*, 436 F.2d 491, 168 USPQ 466 (CCPA 1971).

Applicant refers the Examiner to the previously provided declarations wherein the Examiner

can easily locate from each declarant response which is provided within each of the three above required areas of factual evidence, as previously noted by Applicant to the Examiner.

3. Third, Applicant wishes to respectfully present to the Examiner that Applicant would very much appreciate the Examiner following statutory law and case law instead of what he believes to be the case. Applicant wishes to respectfully present to the Examiner that the statutory law and the case law provide direction as to obviousness. Specifically, in this instance, the first declaration of **Long Felt and Unresolved Need** was from one of expert skill in the art, Mr. Chester A. Vaughn, who is the recently retired rocket propulsion manager of NASA; while, the second declaration of **Long Felt and Unresolved Need** was from one of ordinary skill in the art, Mr. Colin Walker, who is retired from an extensive career in turbo-machinery. As previously provided to the Examiner, the most recent U.S. Supreme Court Case Law provides further direction in relation to obviousness decisions. Specifically, from KSR International v. Teleflex, Inc. et al., No. 04-1350, 550 U.S. __(2007):

> 35 U.S.C. 103(a). "The nonobviousness requirement extends the field of unpatentable material beyond that which is known to the public under § 102, to include that which could readily be deduced from publicly available material by a person of ordinary skill in the pertinent field of endeavor." *Bonito Boats*, 489 U.S. at 150 (citing *Graham*, 383 U.S. at 15).
>
> The question of nonobviousness is ultimately one of law, but it turns on "several basic factual inquiries." *Graham*, 383 U.S. at 17. This Court has identified several such inquiries: (1) "the scope and content of the prior art"; (2) "differences between the prior art and the claims at issue"; and (3) "the level of ordinary skill in the pertinent art." *Ibid.* In addition, the Court has stated that "secondary considerations," such as "commercial success" or "long felt but unsolved needs," might provide "indicia of obviousness or nonobviousness." *Id.* at 17-18.

Again, the declarations provided to the Examiner are in answer to long felt but unsolved needs, which are indicia of non-obviousness. Applicant refers the Examiner to MPEP 716.01 (a), which states:

716.01(a) Objective Evidence of Nonobviousness [R-2]

OBJECTIVE EVIDENCE MUST BE CONSIDERED *>WHEN TIMELY< PRESENT

Affidavits or declarations>, when timely presented,< containing evidence of criticality or unexpected results, commercial success, long-felt but unsolved needs, failure of others, skepticism of experts, etc., must be considered by the examiner in determining the issue of obviousness of claims for patentability under 35 U.S.C. 103. The Court of Appeals for the Federal Circuit stated in *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538, 218 USPQ 871, 879 (Fed. Cir. 1983) that "evidence rising out of the so-called 'secondary considerations' must always when present be considered en route to a determination of obviousness." Such evidence might give light to circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or unobviousness, such evidence may have relevancy. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966); *In re Palmer*, 451 F.2d 1100, 172 USPQ 126 (CCPA 1971); *In re Fielder*, 471 F.2d 640, 176 USPQ 300 (CCPA 1973). The *Graham v. John Deere* pronouncements on the relevance of commercial success, etc. to a determination of obviousness were not negated in *Sakraida v. Ag Pro*, 425 U.S. 273, 189 USPQ 449 (1979) or *Anderson's-Black Rock Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 163 USPQ 673 (1969), where reliance was placed upon *A&P Tea Co. v. Supermarket Corp.*, 340 U.S. 147, 87 USPQ 303 (1950). See *Dann v. Johnston*, 425 U.S. 219, 226 n.4, 189 USPQ 257, 261 n. 4 (1976).

Examiner's Rejections and Objections Along with Applicant's Responsive Argument

The Examiner rejects

Claims 216-220, 222, 224, 231, 235, 238-240, 243, 248-253, 258, 342, are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of U.S. 7062912 (Penfornis et al).

Tindell discloses a solar energy system comprising an electrolysis chamber 13 for forming hydrogen being stored in an hydrogen tank 22, oxygen being stored in an oxygen tank 21, a combustion chamber 33 for burning said hydrogen and oxygen, water input nozzle 31 for injecting water into the combustion chamber, said combustion chamber is then acting as a steam generator to generate steam to drive a steam turbine 47 to generate electricity through a generator 48. Tindell does not teach the air separation unit being powered partly by the combustion energy, the cryogenic air separation unit or membrane air separation unit. Penfornis et al discloses a system

using an air separation unit 4 which can be cryogenic air separation unit, membrane separation unit, or adsorptive PSA or VSA (note column 5, lines 1-5), said air separation unit 4 forming oxidant gas 3 flowing into a combustion chamber (furnace 15), cycle, the output of the steam turbine 22 is used to drive said air separation unit 4 through a compressor 2, note abstract lines 10-12, Penfornis et al clearly states "The heated steam flows through a turbine to produce power. The power is transferred to the air separation unit, thus reducing a power requirement of the air separation unit needed to separate the air. It would have been obvious to provide an air separation unit (either cryogenic, membrane, or adsorption types) in Tindell as taught by Penfornis et al for the purpose of more effectively forming oxygen for the combustion process, and to reserve power input because of the power feedback.

Applicant's Response

Applicant appreciates the Examiner's work in preparing the above prime face case.

Applicant would like to respectfully present to the Examiner that Penfornis et al. does not teach or suggest the combustion of a hydrogen fuel; this is while, as already stated by the Examiner, Tindel et al. does not teach or suggest the separation of air to obtain oxygen for combustion. Further, there is no teaching, suggestion or motivation within Penfornis et al. to seek the teachings of Tindel et al.; while, there is not teaching, suggestion or motivation within Tindel et al. to seek the teachings within Penfornis et al.

In addition, Applicant respectfully presents to the Examiner instant independent claim 216, which states:

216. An engine comprising a combustion camber, wherein a-mixture of oxygen, as O_2, and hydrogen, as H_2, is combusted, wherein

at least a portion of said oxygen is obtained by the separation of air, wherein said separation of air is selected from the group consisting of:

(a) cryogenic air separation,

(b) membrane separation, and

(c) pressure swing adsorption air separation and any combination thereof, wherein at least a portion of the energy of combustion powers at least a portion of said air

separation, and wherein

the temperature of combustion is at least partially controlled with the addition of water to said combustion chamber in a way that maintains combustion or combustion exhaust temperature.

Applicant referred to Tindel et al. seeking the cited claim element teachings propounded by the Examiner. Applicant could not find a direct teaching within Tindel et al. for "the temperature of combustion is at least partially controlled with the addition of water to said combustion chamber in a way that maintains combustion or combustion exhaust temperature" However, Applicant finds Tindel et al. to teach in columns 1 and 2:

> Advantageously, the nozzle means comprises central discharge orifices through which the oxygen and hydrogen gases pass and a surrounding array of openings which can be connected to the condensate. The condensate water fed to said array of orifices serves to cool the nozzle and to supply water to the interior of the burner chamber to control the temperature of the steam discharged through said outlet.

Tindel repeats in col. 2 and 3:

> As shown in FIG. 2 of the drawings, the nozzle 31 includes five central orifices 35 in the downstream face thereof, each connected to a respective mixing control valve 37 which in turn is connected to the storage tanks 21 and 2 containing hydrogen and oxygen gas. The orifices 35 are surrounded by a water jacket 38 which receives feed water 39 and which has a circular array of openings 41 in the downstream face of the nozzle surrounding the orifices 35. The oxygen and hydrogen gases are first mixed by means of the valves 37 in the appropriate stoichiometic proportions and then burned as they exit the nozzle 31. The additional water entering the chamber 33 from the openings 41 serves to reduce the temperature of the steam produced by the oxygen/-hydrogen recombination from a temperature of about 5400° F to about 1250° F.

After much thought and reflection, Applicant agrees with the Examiner that "controlling the temperature of the steam" and/or "reduce the temperature of the steam produced" is equivalent to "the temperature of combustion is at least partially controlled with the addition of water to said combustion chamber in a way that maintains combustion or combustion exhaust temperature".

Further, Applicant would like to present to the Examiner that there is no limitation within instant independent claim 216 for: a flue gas, a heat exchanger or the use of steam generated by a flue gas to produce power, wherein said power drives an air separation unit. This is while there are no teachings or suggestions within the instant specification for a flue gas with a heat exchanger. Therefore, there are teachings and limitations within Penfornis et al. which are not taught in the instant invention or claimed in the instant claims.

Applicant would like to respectfully present to the Examiner that the Penfornis et al. reference comprises requirements and/or limitations which are not taught, suggested or motivated within the instant invention or the instant independent claim. In fact, said requirements and/or limitations would lead one of ordinary skill in the art away from the instant invention and the instant independent claim. Penfornis et al. require the production of a flue gas in combination with a heat exchanger within all teachings. Specifically, the abstract states:

> An air separation unit separates air into an oxygen-rich and oxygen-deficient gas. Fuel gas and the oxygen-rich gas are preheated at heat exchangers through which hot flue gas flows. Combustion of the preheated fuel and oxygen-rich gases result in the hot flue gas. The hot flue gas is cooled at the heat exchangers and flows through a waste heat boiler. Water and/or steam flowing through the waste heat boiler absorbs energy from the cooled flue gas thereby producing heated steam. The heated steam flows through a turbine to produce power. The power is transferred to the air separation unit, thus reducing a power requirement of the air separation unit needed to separate the air.

Further, Penfornis et al. in the section SUMMARY OF THE INVENTION column 3 state:

> Accordingly, a system is provided for recovering thermal energy produced by an oxygen-enriched combustion furnace in which oxidant and fuel gases are combusted thereby producing flue gas. The system includes a source of oxidant gas, at least one heat exchanger system, a waste heat boiler, and a turbine. The oxidant gas has a higher oxygen content than air. The at least one heat exchanger system is adapted to receive the flue gas and at least one of the oxidant gas and the fuel gas, such that the at least one of the oxidant gas and the fuel gas are heated and the flue gas is cooled. The waste heat boiler is adapted to transfer heat from the flue gas to feedwater flowing therethrough to produce superheated steam. Expansion of the superheated steam through the turbine produces mechanical power.

> A method is provided for increasing the energy efficiency of an oxygen-enriched combustion furnace. The method includes the following steps. Oxidant gas and fuel gas are provided, wherein the oxidant gas has an oxygen content higher than air. At least one of the oxidant and fuel gases is allowed to flow through at least one heat exchanger system thereby heating at least one of the oxidant and fuel gases.
>
> The heated oxidant and fuel gases are combusted in the furnace thereby providing flue gas. The flue gas is allowed to flow through the at least one heat exchanger system thereby cooling the flue gas as the oxidant and fuel gases are heated. The feedwater and the flue gas are allowed to flow through a waste heat boiler such that heat from the flue gas is transferred to the feedwater thereby producing superheated steam. The superheated steam is allowed to be expanded through a turbine thereby producing mechanical power.

Further still, all of the drawings within Penfornis et al. illustrate the same requirement and/or limitation. This requirement and/or limitation are/is in stark contrast to the teachings of the instant invention. Specifically, the instant invention teaches operation without a flue gas contacting a heat exchanger to generate steam. In strong contrast to Penfornis et al., the instant invention teaches **direct** generation of steam from the combustion chamber. Applicant refers the Examiner within the instant invention to Figures 2A, 3, 6-8, 10-11, 15-18, 21 and 21A. Applicant also refers the Examiner within the instant specification to paragraphs 34, 79, 80, 83-85, 87-89, 92-95, 98 and 119-120. **There is not taught within the instant invention or claimed within any instant claim the need of a heat exchanger to create power. In contrast to Penfornis et al., the instant invention teaches the elimination of a heat exchanger to create power. This difference is an important aspect for the inventive step in the instant invention; and therefore, renders the instant invention non-obvious as compared to the prior art and the cited reference. Most importantly, within U.S. Patent Law this difference demonstrates a teaching away of the instant invention by Penfornis et al.**

Applicant respectfully refers the Examiner to MPEP 2145 D:

> **References Teach Away from the Invention or Render Prior Art Unsatisfactory for Intended Purpose**
>
> In addition to the material below, see MPEP § 2141.02 **(prior art must be considered in its entirety, including disclosures that teach away from the claims)** and MPEP § 2143.01 (proposed modification cannot render the prior art unsatisfactory for its intended purpose or change the principle of operation of a reference). **(Emphasis added)**

1. **The Nature of the Teaching Is Highly Relevant**

A prior art reference that "teaches away" from the claimed invention is a significant factor to be considered in determining obviousness; however, "the nature of the teaching is highly relevant and must be weighed in substance. A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use." *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994) (Claims were directed to an epoxy resin based printed circuit material. A prior art reference disclosed a polyester-imide resin based printed circuit material, and taught that although epoxy resin based materials have acceptable stability and some degree of flexibility, they are inferior to polyester-imide resin based materials. The court held the claims would have been obvious over the prior art because the reference taught epoxy resin based material was useful for applicant's purpose, applicant did not distinguish the claimed epoxy from the prior art epoxy, and applicant asserted no discovery beyond what was known to the art.).

Furthermore, "the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not **criticize, discredit, or otherwise discourage the solution claimed**...." *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004). **(Emphasis added)**

2. **References Cannot Be Combined Where Reference Teaches Away from Their Combination**

It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983) (The claimed catalyst which contained both iron and an alkali metal was not suggested by the combination of a reference which taught the interchangeability of antimony and alkali metal with the same beneficial result, combined with a reference expressly excluding antimony from, and adding iron to, a catalyst.).

Applicant also refers the Examiner to MPEP 2141.02 VI:

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984) (Claims were directed to a process of producing a porous article by expanding shaped, unsintered, highly crystalline poly(tetrafluoroethylene) (PTFE) by stretching said PTFE at a 10% per second rate to more than five times the original length. The prior art teachings with regard to unsintered PTFE indicated the material does not respond to conventional plastics processing, and the material should be stretched slowly. A reference teaching rapid stretching of conventional plastic polypropylene with reduced crystallinity combined with a reference teaching stretching unsintered PTFE would not suggest rapid stretching of highly crystalline PTFE, in light of the disclosures in the art that teach away from the invention, i.e., that the conventional polypropylene should have reduced crystallinity before stretching, and that PTFE should be stretched slowly.). **(Emphasis added)**

Further, it is important for Applicant to present to the Examiner that in reference to

combustion chemistries and operating equipment, as well as a combustion engine that does not produce COX or NOX, Applicant has identified the **source of the problem** not previously identified within any of the Examiner's Citations. Specifically, Applicant teaches the combustion of hydrogen and oxygen in combination with novel applications of the combustion of hydrogen and oxygen, therein providing unique improvements within the instant invention not previously taught, suggested or motivated, especially within the Examiner's citations. Applicant refers the Examiner within the instant specification to paragraphs 12, 13 and 14, along with those previously presented above, e.g. Figures 2A, 3, 6-8, 10-11, 15-18, 21 and 21A, and paragraphs 34, 79, 80, 83-85, 87-89, 92-95, 98 and 119-120. In combination with these references within the instant invention, Applicant refers the Examiner to MPEP 2141.02:

> "**[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified.** This is part of the 'subject matter as a whole' which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103." *In re Sponnoble*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969). However, "discovery of the cause of a problem ... does not always result in a patentable invention. . . . **[A] different situation exists where the solution is obvious from prior art which contains the same solution for a similar problem**." *In re Wiseman*, 596 F.2d 1019, 1022, 201 USPQ 658, 661 (CCPA 1979) (emphasis in original)." **(Emphasis added)**

Applicant respectfully submits to the Examiner that hydrocarbon combustion systems, as taught in Penfornis et al., require heat exchange equipment to create steam energy. Such is well known in the art, as taught in Penfornis et al. This fact is in stark contrast to the instant invention; therefore, the combination of Tindel et al. and Penfornis et al. presents a case of **hindsight reconstruction**.

Given the needs of flue gas heat exchange in hydrocarbon combustion power systems, it would be irrational for one of ordinary skill in the art to create a combustion system without flue gas heat exchange. Specifically, for one of ordinary skill in the art to come up with the instant invention from Tindel et al. and Penfornis et al., one of ordinary skill in the art would have to: 1) ignore the hydrocarbon combustion teachings within Penfornis et al. and replace the hydrocarbon fuel as taught in Penfornis et al. with a hydrogen fuel as taught in Tindel et al., 2) ignore the teachings within Penfornis et al. for a flue gas performing heat exchange with water in order to produce steam energy, while 3) directly creating steam energy to power the air separation unit as is taught in the instant invention, and which is not taught in any of the cited references. Therefore, for one of ordinary skill in

the art to have developed the instant invention from the cited references, one of ordinary skill in the art would have to make 3 irrational decisions. Therefore, the prime facie case of Tindel et al. and Penfornis et al. to arrive at instant independent claim 216 is **hindsight reconstruction**. Applicant refers the Examiner to MPEP 2145 X:

> ARGUING IMPROPER RATIONALES FOR COMBINING REFERENCES
>
> A. Impermissible Hindsight
>
> Applicants may argue that the examiner's conclusion of obviousness is based on improper hindsight reasoning. However, "[a]ny judgement on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account **only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper.**" *In re McLaughlin* 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971). Applicants may also argue that the combination of two or more references is "hindsight" because "express" motivation to combine the references is lacking. However, there is no requirement that an "express, written motivation to combine must appear in prior art references before a finding of obviousness." See *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1276, 69 USPQ2d 1686, 1690 (Fed. Cir. 2004). For example, motivation to combine prior art references may exist in the nature of the problem to be solved (*Ruiz* at 1276, 69 USPQ2d at 1690) or the knowledge of one of ordinary skill in the art (*National Steel Car v. Canadian Pacific Railway Ltd.*, 357 F.3d 1319, 1338, 69 USPQ2d 1641, 1656 (Fed. Cir. 2004)). See **MPEP § 2143.01** for a discussion of proper motivation to combine references. **(Emphasis added)**

Applicant refers the Examiner to recent U.S. Supreme Court Case Law, KSR International v. Teleflex, Inc. et al., No. 04-1350, 550 U.S. __(2007).

> 4. The Federal Circuit's perspective on the problem of hindsight is itself problematic. This Court cautioned in *Graham* against "read[ing] into the prior art the teachings of the invention in issue." 383 U.S. at 36. The Court did not perceive, however, any need for extraordinary showings of obviousness to avoid that danger. The Federal Circuit's rigid test underestimates the capacity of courts and the PTO to avoid the influence of hindsight. Retrospective analysis is not unique to patent law, but regularly arises in a wide variety of contexts, including the determination of the competency of counsel in criminal proceedings, see, *e.g.*, *Rompilla v. Beard*, 125 S. Ct. 2456, 2462 (2005), reasonable use of force by police officers, see, *e.g.*, *Graham v. Connor*, 490 U.S. 386, 396 (1989),

and probable cause, see, *e.g.*, *Maryland* v. *Garrison*, 480 U.S. 79, 85 (1987). In those situations, as in *Graham*, the Court has consistently recognized that decisionmakers can avoid the improper influence of hindsight by maintaining conscious awareness of its potentially distorting influence in the decisionmaking process.[10] Courts routinely find, for example, an absence of probable cause in cases in which the police in fact find substantial quantities of contraband in a search. There is no reason to think that courts in patent cases cannot be similarly discerning.

The "ultimate question" of patent validity under Section 103(a) is a question of law. *Graham*, 383 U.S. at 17. It rests on a legal judgment, informed by relevant facts, of whether the hypothetical person having ordinary skill in the art would have found the invention as a whole "obvious." Section 103(a) itself identifies three "central factors relevant to any inquiry into obviousness" (*Johnston*, 425 U.S. at 226): the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the pertinent art. See *Graham*, 383 U.S. at 17. Other "secondary considerations" —including a long-felt and unfulfilled need for the invention, the prior failures of others, and the commercial success of the invention—may also provide "indicia" supporting the legal conclusion of "obviousness or nonobviousness," *id.* at 17-18, 35-36, but those considerations will not render an obvious invention patentable. *Anderson's-Black Rock, Inc.* v. *Pavement Salvage Co.*, 396 U.S. 57, 61 (1969) (citing *Great Atl. & Pac. Tea Co.* v. *Supermarket Equip. Corp.*, 340 U.S. 147, 153 (1950)).

Still further, Applicant also refers the Examiner to the previously submitted declarations of Mr. Chester Vaughan and Mr. Colin Walker, both of which demonstrate to the Examiner that the instant invention is non-obvious due to the instant claims answering **long felt and unresolved needs**. Applicant again refers the Examiner to MPEP 716.04 and KSR International v. Teleflex, Inc. et al., No. 04-1350, 550 U.S. __(2007).

Finally, Applicant refers the Examiner to Tindel et al., wherein the teachings of Tindel et al. require a photovoltaic cell to power the entire system (ref. abstract, col. 1 lines 35-63, col. 2 lines 25 -37). There is no such restriction within the instant independent claim.

Applicant summarizes for the Examiner:

1. The scope and content of the prior art comprise:
    - Tindel et al. – generation of electrical power from the combustion of hydrogen and

oxygen, wherein the hydrogen and oxygen are obtained by the electrolysis of water and wherein combustion is cooled by water injection. The entire system is power by photovoltaic cells.

- Penfornis et al. – an air separation unit is powered by steam produced from the energy of a flue gas wherein the flue gas energy is transferred to water to create steam via a heat exchanger, wherein the flue gas is created by the combustion of a hydrocarbon fuel with oxygen, and wherein the oxygen is obtained from said air separation unit.

2. The scope and content of the instant independent claim comprises:
   - Combustion of hydrogen and of oxygen,
   - Providing said oxygen to combustion via air separation, wherein the air separation is powered by combustion, and
   - Cooling of combustion temperature with water.
3. The differences between the prior art and the instant independent claim comprise:
   - Need of a flue gas to contact heat exchange (Penfornis et al.),
   - Heat exchange to create steam power to drive air separation (Penfornis et al.),
   - Elimination of heat exchange equipment by the combustion of hydrogen with oxygen (instant invention), and
   - Long felt and unresolved needs for the engine in the instant independent claim (instant invention and instant claims).
4. The level of skill for one of ordinary skill in the art would be similar to or as that of Mr. Colin Walker as stated in his declaration, e.g. a high level technician or an engineer in combustion science and/or combustion equipment. This is while Mr. Walker views the instant independent claim and the instant invention as novel and meeting long felt and unresolved needs.

The Examiner rejects

Claim 223 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of Penfornis et al and U.S. 6588212 (Wallace et al). Tindell as modified by Penfornis et al discloses all the claimed subject matter as set forth above, but does not disclose the use of nitrogen in a mixture of the combustion chamber. Wallace et al teaches it's well known to use nitrogen in a gas mixture before

feeding into a combustion chamber to help increase power generation (note column 1, lines 23-32). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide nitrogen in Tindell as taught by Wallace et al for the purpose of increasing power generation.

Applicant's Response

Applicant respectfully presents to the Examiner (ref. abstract and paragraphs 5, 61, 62, 79-98, 101 and 104-105) that Applicant does not use nitrogen to "increase power generation". In strong contrast, Applicant teaches air (80% nitrogen) for the cooling of combustion. This is while there is no teaching or suggestion within Wallace et al. for said cooling. Therefore, the Examiner's cited combination of Tindel et al. in view of Penfornis et al. and in view of Wallace et al. is traversed. Applicant herein respectfully requests an allowance of independent claim 223 as presented herein.

The Examiner rejects

Claims 225-227 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of Penfornis et al and U.S. 5899072 (Gode). Tindell as modified by Penfornis et al discloses all the claimed subject matter as set forth above, but does not disclose the use of corrosion to form hydrogen. Gode is relied upon to disclose it's well known to use corrosion to form hydrogen (column 1, lines 36-49). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form hydrogen by corrosion in Tindell as taught by Gode for the purpose of generating more hydrogen if needed.

Applicant's Response

Applicant would like to respectfully present to the Examiner that once Applicant has traversed a prime facie case of obviousness relating to an independent claim, in this case claim 216, Applicant has also traversed the rejection of any claim which depends upon the independent claim, reference MPEP 2143.03. Therefore, as Applicant has respectfully traversed the Examiner's 35 U.S.C. 103(a) rejection of independent claim 216, Applicant respectfully requests an allowance of claims 225-277.

The Examiner rejects

Claims 231, 235 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of Penfornis et al and U.S. 5516359 (Kang et al). Tindell as modified by Penfornis et al discloses all the claimed subject matter as set forth above, but does not disclose the use of air separation unit with membrane. Kang et al is relied upon to disclose it's well known to use air separation unit 107 with membrane 108 for separating air. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use an air separation unit with membrane in Tindell as taught by Kang et al for the purpose of separating air to form more important components if needed.

Applicant's Response

Applicant would like to respectfully present to the Examiner that once Applicant has traversed a prime facie case of obviousness relating to an independent claim, in this case claim 216, Applicant has also traversed the rejection of any claim which depends upon the independent claim, reference MPEP 2143.03. Therefore, as Applicant has respectfully traversed the Examiner's 35 U.S.C. 103(a) rejection of independent claim 216, Applicant respectfully requests an allowance of claim 231 and 235.

The Examiner rejects

Claim 237 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of Penfornis et al and U.S. 4440545 (Weidig). Tindell as modified by Penfornis et al discloses all the claimed subject matter as set forth above, but does not disclose the use of corrosion inhibitor. Weidig is relied upon to disclose it's well known to use corrosion inhibitor in a combustion chamber. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use corrosion inhibitor in Tindell as taught by Weidig for the purpose of inhibiting corrosion in the combustion chamber.

Applicant's Response

Applicant would like to respectfully present to the Examiner that once Applicant has traversed a prime facie case of obviousness relating to an independent claim, in this case claim 216, Applicant has also traversed the rejection of any claim which depends upon the independent claim, reference MPEP 2143.03. Therefore, as Applicant has respectfully traversed the Examiner's 35 U.S.C. 103(a) rejection of independent claim 216, Applicant respectfully requests an allowance of claim 237.

The Examiner rejects

Claim 241 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of Penfornis et al and U.S. 3975913 (Erickson). Tindell as modified by Penfornis et al discloses all the claimed subject matter as set forth above, but does not disclose the use of fuel cell. Erickson is relied upon to disclose it's well known to use fuel cell 1 to work in combination with an electrolysis chamber. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use fuel cell in Tindell as taught by Erickson for the purpose of generating the appropriate amount of hydrogen and oxygen.

Applicant's Response

Applicant would like to respectfully present to the Examiner that once Applicant has traversed a prime facie case of obviousness relating to an independent claim, in this case claim 216, Applicant has also traversed the rejection of any claim which depends upon the independent claim, reference MPEP 2143.03. Therefore, as Applicant has respectfully traversed the Examiner's 35 U.S.C. 103(a) rejection of independent claim 216, Applicant respectfully requests an allowance of claim 241.

The Examiner rejects

Claim 242 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of Penfornis et al and US 4664857 (Nambu). Tindell as modified by Penfornis et al discloses all the claimed subject matter as set forth above,

but does not disclose the use of gel storage. Nambu discloses the concept of freezing a hydrogel with water content of 20-92% into a storage vessel (note abstract), column 11, lines 27-31, clearly discloses the frozen water, column 10, lines 34-35, discloses the freeze-molded gel. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use gel storage in Tindell as taught by Nambu for the purpose of more effectively storing the elements.

Applicant's Response

Applicant would like to respectfully present to the Examiner that the Nambu reference requires a hydrocarbon alcohol. Specifically, the Nambu abstract states:

> A hydrogel which has a water content of 20 to 92 weight % and which is stable and superior in mechanical properties is obtained by preparing a 3 to 25 weight % aqueous solution of a polyvinyl alcohol having a degree of hydrolysis not less than 95 mol % and a viscosity-average polymerization degree of not less than 1,500, then pouring the aqueous polyvinyl alcohol solution into a desired shape of a vessel or a mold, then freeze-molding the aqueous polyvinyl alcohol solution at a temperature lower than −6° C., thereafter dehydrating the molded article without thawing it until the dehydration percentage reaches 5 weight % or more and, if required, immersing the dehydrated product in water.

Nambu states again in col. 4:

> The above-mentioned objects of the present invention are attained by the steps: preparing a 3 to 25 weight % aqueous solution of a polyvinyl alcohol having a degree of hydrolysis not less than 95 mol % and a viscosity-average polymerization degree of not less than 1,500, pouring said aqueous polyvinyl alcohol solution into a desired shape of a vessel or a mold, freeze-molding said poured aqueous polyvinyl alcohol solution at a temperature lower than −6° C., vacuum-dehydrating the resulting molded article without thawing it up to a dehydration percentage (percentage reduction in weight of the frozen body) of not less than 5 weight % and thawing said dehydrated article.

And, Nambu states again in col. 5:

> It is essential that the degree of hydrolysis of polyvinyl alcohols used in the present invention be not less than 95 mol %, preferably not less than 97 mol % and more preferably not less than 98 mol %. Even if polyvinyl alcohols having a degree of hydrolysis in the range of from 80 to 88 mol %, particularly 85 mol % or less, are used, there are obtained only weak gels, and therefore the objects of the present invention are not attainable.
>
> Polyvinyl alcohols used in the present invention are required to have a viscosity-average polymerization degree of not less than 1,500. At lower polymerization degrees there are formed only weak gels. In the present invention, there may be used polyvinyl alcohols having a polymerization degree in the range of 1,500 to about 3,300, preferably not less than 1,800, but it is recommended to use commercially available products of high polymerization degrees (1,800–2,600) as they are.
>
> According to the process of the present invention, first an aqueous solution of a polyvinyl alcohol is prepared. The concentration of polyvinyl alcohol is 3 to 25, preferably 6 to 25 and more preferably 7 to 15 weight %. The concentration of polyvinyl alcohol can be further increased up to say 90%, but in this case the viscosity of the auqeous solution at room temperature reaches as high as 10,000 cP or more, or the aqueous solution in storage may undergo an increase in its viscosity, or its gelation may take place. Therefore, its handling is a little difficult. In case of lower concentrations than 3 weight %, it would prolong the time required for dehydration (drying) and cause an increase in the cost (cost of dehydration power) and there are obtained only weak gel.

As previously stated to the Examiner, the instant invention teaches the combustion of hydrogen and of oxygen. This is while instant claim 242 states:

242. The engine of claim 216, wherein at least one of said hydrogen and oxygen is stored in a mixture with frozen water crystals to form a gel.

There is no teaching within the instant specification or claimed within instant claim 242 to a hydrogel as taught in Nambu. At best Nambu teaches away from the "gel" taught and claimed within the instant invention and the instant claims, respectively.

As Applicant has respectfully traversed the Examiner's rejection of 242, Applicant respectfully requests an allowance of claim 242 as presented herein.

The Examiner rejects

Claims 259-260, 350, are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of Perfornis et al and US 6212876 (Gregory et al). Tindell as modified by Perfornis et al discloses all the claimed subject matter as set forth above, but does not disclose the jet propulsion rocket. US 6212876 (Gregory et al) teaches a rocket propulsion engine using combustion engine. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use jet propulsion rocket in Tindell as taught by Gregory et al for the purpose of driving rocket if needed (note it's well known to use combustion engine such as gas engine to produce thrust in aircraft/rocket design).

Applicant's Response

Applicant would like to respectfully present to the Examiner that once Applicant has traversed a prime facie case of obviousness relating to an independent claim, in this case claim 216, Applicant has also traversed the rejection of any claim which depends upon the independent claim, reference MPEP 2143.03. Therefore, as Applicant has respectfully traversed the Examiner's 35 U.S.C. 103(a) rejection of independent claim 216, Applicant respectfully requests an allowance of claims 259-260 and 350.

The Examiner rejects

Claims 244-247 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 4841731 (Tindell) in view of Perfornis et al and U.S. 6698183 (Thordarson). Tindell as modified by Perfornis et al discloses all the claimed subject matter as set forth above, but does not disclose the use of flywheel and transmission. Thordarson is relied upon to disclose it's well known to use flywheel 176 and transmission 178 for transmitting power from a combustion chamber/engine 22. It would have been obvious

at the time the invention was made to a person having ordinary skill in the art to use flywheel and transmission in Tindell as taught by Thordarson for the purpose of transmitting power output of the combustion engine.

Applicant's Response

Applicant would like to respectfully present to the Examiner that once Applicant has traversed a prime facie case of obviousness relating to an independent claim, in this case claim 216, Applicant has also traversed the rejection of any claim which depends upon the independent claim, reference MPEP 2143.03. Therefore, as Applicant has respectfully traversed the Examiner's 35 U.S.C. 103(a) rejection of independent claim 216, Applicant respectfully requests an allowance of claims 244-247.

Applicant appreciates the Examiner's withdrawal of previous claim rejections.

CONCLUSION

In view of the foregoing, Applicant believes that the claims as presently amended, are in order for allowance; Applicant respectfully requests favorable reconsideration of this response and amendment, and allowance of the claims at the earliest opportunity.

Applicant has respectfully presented to the Examiner that the cited combinations either: **teach away** from or perform **hindsight reconstruction** in relation to the instant claims.

Applicant has also respectfully presented to the Examiner that the cited combinations do not present or teach **the source of the problem** as has Applicant.

Applicant has further respectfully presented secondary considerations in the form of three declarations, two from a person of ordinary skill in the art and one from a person of expert skill in the art, all of which demonstrate that the instant invention and the instant invention claims **answer a long felt and unresolved need**, which has been recognized by those of ordinary skill in the art for some time and which was not answered prior to the filing of the instant invention.

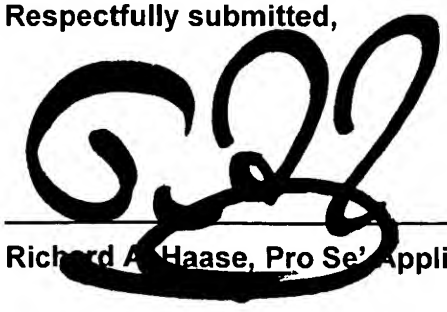
Applicant has further still previously presented **disbelief to the instant invention**, as claimed, from a representative of the US DOD, wherein said representative is at least one of ordinary skill in the art while representing those who are obviously of expert skill in the art.

Finally, applicant has prepared **a comparison of the instant claims to the prior art, along with a description of one of those of ordinary skill in the art**.

Applicant appreciates the time and effort afforded by the Examiner in the prosecution of the instant claims for the instant invention.

As Applicant has respectfully traversed all of the Examiner's rejections, Applicant herein requests the award certificate for the instant claims as amended and presented herein.

Respectfully submitted,



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